Therefore, we claim:

1. In an electrodepositable coating composition comprising a resinous phase dispersed in an aqueous medium, said resinous phase comprising:

(a) an active hydrogen-containing, cationic salt group-containing resin; and

(b) an at least partially blocked polyisocyanate curing agent,

the improvement comprising the inclusion in the electrodepositable coating composition of an organotin catalyst for effecting cure between the resin (a) and the curing agent (b), wherein said catalyst is or is derived from a dialkyltin compound having the following structure (I):

$$[R_1][R_2]\text{- Sn = O} \qquad \text{(I)}$$

where R_1 and R_2 are the same or different, and each independently represents a monovalent hydrocarbon group, wherein the sum of the carbon atoms of R_1 and R_2 is greater than 8,

said catalyst being present in the electrodepositable coating composition in an amount sufficient to effect cure of the electrodepositable composition at a temperature at or below 340°F (171.1°C).

2. The electrodepositable coating composition of claim 1, wherein at least one of R_1 and R_2 represents a monovalent hydrocarbon group having at least 4 carbon atoms, provided that at least one of R_1 and R_2 represents a monovalent hydrocarbon group having greater than 4 carbon atoms.

3. The electrodepositable coating composition of claim 1, wherein at least a portion of the catalyst is dispersed in one or both of the resin (a) and the curing agent (b) prior to dispersing the resinous phase in the aqueous medium.

4. The electrodepositable coating composition of claim 1, wherein at least a portion of the catalyst is dispersed in the aqueous medium prior to dispersion of the resinous phase in the aqueous medium.

5. The electrodepositable coating composition of claim 3, wherein at least a portion of the catalyst is dispersed in the aqueous medium prior to dispersion of the resinous phase in the aqueous medium.

6. The electrodepositable coating composition of claim 1, wherein the catalyst is present in the coating composition in an amount sufficient to effect cure of the coating composition at or below a temperature of 320°F (160°C).

7. The electrodepositable coating composition of claim 1, wherein the resin (a) comprises active hydrogens derived from reactive hydroxyl groups and/or primary amine groups.

8. The electrodepositable coating composition of claim 7, wherein at least a portion of the hydroxyl groups comprise phenolic hydroxyl groups.

9. The electrodepositable coating composition of claim 7, wherein the resin (a) is the reaction product of a polyepoxide and a diglycidyl ether of a polyhydric phenol.

10. The electrodepositable coating composition of claim 1, wherein at least a portion of the active hydrogens present in the resin (a) comprise primary amine groups derived from the reaction of a ketimine-containing compound and an epoxy group-containing material.

11. The electrodepositable coating composition of claim 1, wherein the curing agent (b) is at least partially blocked with a blocking agent comprising one or more 1,3-glycols and/or 1,2-glycols.

12. The electrodepositable coating composition of claim 11, wherein the 1,2-glycol comprises a C_3 to C_6 1,2-glycol.

13. The electrodepositable coating composition of claim 11, wherein the curing agent (b) comprises a blocking agent selected from at least one of 1,2-propanediol, 1,2-butanediol, 1,3-butanediol, 1,2-pentanediol and 1,2-hexanediol.

14. The electrodepositable coating composition of claim 1, wherein the resin (a) comprises reactive hydroxyl groups and/or primary amine groups, and the curing agent (b) is at least partially blocked with a blocking agent comprising one or more 1,2-glycols.

15. The electrodepositable coating composition of claim 14, wherein at least a portion of the reactive hydroxyl groups comprise phenolic hydroxyl groups.

16. The electrodepositable coating composition of claim 1, wherein the catalyst is substantially non-volatile at a temperature at or below 340°F (171.1°C).

17. The electrodepositable coating composition of claim 1, wherein at least one of R_1 and R_2 represents a monovalent hydrocarbon group having 8 or more carbon atoms.

18. The electrodepositable coating composition of claim 1, wherein the catalyst comprises dioctyltin oxide and/or its derivatives.

19. The electrodepositable coating composition of claim 1, wherein the catalyst is present in the coating composition in an amount ranging from 0.1 to 5.0 percent by weight of tin based on weight of total resin solids present in the electrodepositable coating composition.

20. The electrodepositable coating composition of claim 1, wherein the catalyst is dispersed in one or both of the resin (a) and the curing agent (b) prior to dispersion of the resinous phase in the aqueous medium.

21. The electrodepositable coating composition of claim 1, which is free of lead-containing compounds.

22. The electrodepositable coating composition of claim 1, further comprising at least one of a bismuth compound, a zirconium compound, and a zinc compound.

23. In a method for preparing an electrodepositable coating composition comprising a resinous phase dispersed in an aqueous medium, said resinous phase comprising:

(a) an active hydrogen-containing, cationic salt group-containing resin;

(b) an at least partially blocked polyisocyanate curing agent; and

(c) an organotin catalyst for effecting the cure of the resin (a) and the curing agent (b),

said method comprising the steps of

(1) preparing the resin (a) from a mixture of reactive components;

(2) preparing the at least partially blocked polyisocyanate curing agent (b) separate from the resin (a) by reacting a polyisocyanate and a blocking agent;

(3) admixing the resin (a) and the curing agent (b) to form a resinous admixture;

(4) blending an organic and/or inorganic acid with the resinous admixture to form an acidified admixture; and

(5) dispersing the acidified admixture of (4) in an aqueous medium,

the improvement comprising incorporating the organotin catalyst (c) into the mixture of reactive components during the preparation of the resin (a) in step (1),

wherein the catalyst (c) is or is derived from a dialkyltin compound having the following structure (I):

$$[R_1][R_2]\text{- Sn} = O \qquad (I)$$

where R_1 and R_2 are the same or different, and each independently represents a monovalent hydrocarbon group wherein the sum of the carbon atoms in R_1 and R_2 is greater than 8,

said catalyst being present in the electrodepositable coating composition in an amount sufficient to effect cure of the electrodepositable composition at a temperature at or below 340°F (171.1°C).

24. The electrodepositable coating composition of claim 23, wherein at least one of R_1 and R_2 represents a monovalent hydrocarbon group having at least 4 carbon atoms, provided that at least one of R_1 and R_2 represents a monovalent hydrocarbon group having greater than 4 carbon atoms.

25. The method of claim 23, wherein the ratio of equivalents of organic carboxylic acid derived from the hydrolysis of an organotin carboxylate to the equivalents of organotin present in the electrodepositable composition is no more than 2.0.

26. The method of claim 23, wherein the ratio of equivalents of organic carboxylic acid derived from the hydrolysis of an organotin carboxylate to the equivalents of organotin present in the electrodepositable composition is no more than 1.0

27. The method of claim 23, wherein the resin (a) is prepared in step (1) by reacting

a polyepoxide,

a polyhydroxyl group-containing material at least a portion of which comprises phenolic hydroxyl groups, and

a cationic salt group-former selected from the group consisting of amines and ketimines.

28. The method of claim 23, wherein the curing agent (b) is prepared in step (2) by reacting a polyisocyanate with a blocking agent comprising a C_3 to C_6 1,2-glycol.

29. The method of claim 23, wherein the catalyst (c) comprises dioctyltin oxide and/or its derivatives.

30. The method of claim 23, wherein the catalyst (c) is added during step (1) in an amount sufficient to provide 0.1 to 5.0 percent by weight tin based on weight of total resin solids present in the electrodepositable coating composition.

31. The method of claim 27, wherein the active hydrogens present in the resin (a) are derived from reactive hydroxyl groups at least a portion of which comprise phenolic hydroxyl groups, and/or primary amine groups derived from the reaction of a ketimine-containing compound and an epoxy-group containing material.

32. In a method of electrocoating a conductive substrate serving as a cathode in an electrical circuit comprising said cathode and an anode, said cathode and anode being immersed in an aqueous electrocoating composition,

said method comprising passing electric current between said cathode and anode to cause deposition of the electrocoating composition onto the substrate as a substantially continuous film, the aqueous electrocoating composition comprising a resinous phase dispersed in an aqueous medium, said resinous phase comprising:

(a) an active hydrogen group-containing, cationic group-containing electrodepositable resin, and

(b) at least partially blocked polyisocyanate curing agent,

the improvement comprising the inclusion in the electrocoating composition of an organotin catalyst for effecting cure between the resin (a) and the curing agent (b), wherein said catalyst is or is derived from a dialkyltin compound having the following structure (I):

$$[R_1][R_2]\text{- Sn} = O \qquad (I)$$

where R_1 and R_2 are the same or different, and each independently represents a monovalent hydrocarbon group, wherein the sum of the carbon atoms of R_1 and R_2 is greater than 8,

said catalyst being present in the electrocoating composition in an amount sufficient to effect cure of the electrocoating composition at a temperature at or below 340°F (171.1°C).

33. The method of claim 32, wherein at least one of R_1 and R_2 represents a monovalent hydrocarbon group having greater than 4 carbon atoms, provided that at least one of R_1 and R_2 represents a monovalent hydrocarbon group having greater than 4 carbon atoms.

34. The method of claim 32, wherein the catalyst is present in the electrocoating composition in an amount sufficient to effect cure of the coating composition at or below a temperature of 320°F (160°C).

35. The method of claim 32, wherein the resin (a) comprises active hydrogens derived from reactive hydroxyl groups and/or primary amine groups.

36. The method of claim 35, wherein at least a portion of the hydroxyl groups comprise phenolic hydroxyl groups.

37. The method of claim 35, wherein the resin (a) is the reaction product of a polyepoxide and a polyhydric phenol.

38. The method of claim 32, wherein at least a portion of the active hydrogens present in the resin (a) comprise primary amine groups derived from the reaction of a ketimine-containing compound and an epoxy group-containing material.

39. The method of claim 32, wherein the curing agent (b) is at least partially blocked with a blocking agent comprising one or more 1,3-glycols and/or1,2-glycols.

40. The method of claim 39, wherein the 1,2-glycol comprises a C_3 to C_6 1,2-glycol.

41. The method of claim 39, wherein the curing agent (b) comprises a blocking agent selected from at least one of 1,2-propanediol, 1,2-butanediol, 1,3-butanediol, 1,2-pentanediol and 1,2-hexanediol.

42. The method of claim 32, wherein the resin (a) comprises reactive hydroxyl groups and/or primary amine groups, and the curing agent (b) is at least partially blocked with a blocking agent comprising one or more 1,2-glycols.

43. The method of claim 42, wherein at least a portion of the reactive hydroxyl groups comprise phenolic hydroxyl groups.

44. The method of claim 32, wherein the catalyst is substantially non-volatile at a temperature at or below 340°F (171.1°C).

45. The method of claim 32, wherein at least one of R_1 and R_2 represents a monovalent hydrocarbon group having 8 or more carbon atoms.

46. The method of claim 32, wherein the catalyst comprises dioctyltin oxide and/or its derivatives.

47. The method of claim 32, wherein the catalyst is present in the electrocoating composition in an amount ranging from 0.1 to 5.0 percent by weight of tin based on weight of total resin solids present in the electrocoating composition.

48. The method of claim 32, wherein at least a portion of the catalyst is dispersed in one or both of the resin (a) and the curing agent (b) prior to dispersion of the resinous phase in the aqueous medium.

49. The method of claim 32, wherein at least a portion of the catalyst is dispersed in the aqueous medium prior to dispersion of the resinous phase in the aqueous medium.

50. The method of claim 48, wherein at least a portion of the catalyst is dispersed in the aqueous medium prior to dispersion of the resinous phase in the aqueous medium.

51. The method of claim 32, wherein the electrocoating composition is free of lead-containing compounds.

52. The method of claim 32, wherein the electrocoating composition further comprises at least one of a bismuth compound, and a zinc compound.